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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Original Version	Sept 04
2.0	Updated	Dec 04
2.1	Updated laser safety warnings	Aug 05
2.2	Added table format to section 4. General clean up.	Feb 09

WARNING

Never look directly into an optical fiber. Non-reversible damage to the eye can occur in a matter of milliseconds.

Do not hook up the 7707VT-2-HD DWDM cards and any 7707VR-2-HD series cards directly with a short fiber optic cable. The 7707VT-2-HD DWDM card produces +7dBm of power which will damage the receiver if connected directly.

Do not hook up the 7707VT-2-HD cards that output more than -7dBm of power (see 7707VT-2-HD specifications for output power of various laser types) and 7707VR-2-HD-H high sensitivity receiver cards directly with a short fiber optic cable. The 7707VT-2-HD cards that produce more than -7dBm of power will damage the receiver if connected directly.

1. OVERVIEW

The 7707VR-2-HD is a VistaLINK® –enabled fiber optic receiver for SMPTE 292M (1.485Gb/s). This single card module demultiplexes two HD-SDI signals that have been Time Domain Multiplexed (TDM) by the companion 7707VT-2-HD Dual HD-SDI Fiber Transmitter module.

The 7707VR-2-HD and companion 7707VT-2-HD will transparently pass embedded AES audio or any other data in the horizontal or vertical ancillary data space. Monitoring and control of card status and parameters is provided locally at the card edge or remotely via VistaLINK®.

Features:

- Single card demultiplexor for four synchronous or asynchronous SMPTE 292M (1.485Gb/s) video signals
- HD-SDI video regeneration on outputs
- Signal transport over fiber uninterrupted by loss of any input video feed
- Transparently passes embedded AES or any other data in the horizontal or vertical ancillary data space
- Comprehensive signal and card status monitoring via four-digit card-edge display
- VistaLINK® –enabled for remote monitoring and control when installed in a 7700FR-C frame with 7700FC VistaLINK® Frame Controller
- Supports single-mode and multi-mode fiber
- Accepts any wavelength in the 1270nm to 1610nm range
- SC/PC, ST/PC, FC/PC fiber connectors available

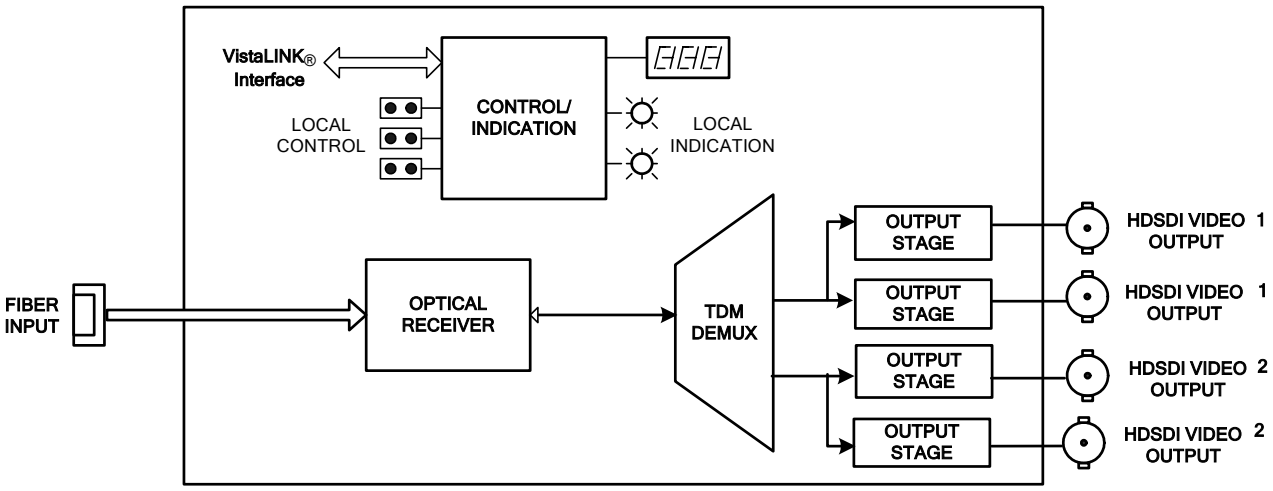

Figure 1-1: 7707VR-2-HD Block Diagram

2. INSTALLATION

The 7707VR-2-HD comes with a companion rear plate that has four BNC connectors and one SC/PC (shown), ST/PC or FC/PC optical connector. For information on mounting the rear plate and inserting the module into the frame see the 7700FR chapter section 3.

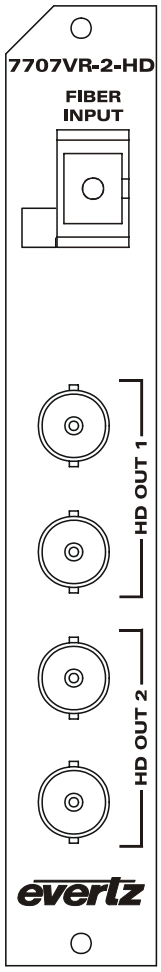

Figure 2-1: 7707VR-2-HD Rear Panel

OPTICAL INPUT: SC/PC, SC/PC with cover (shown), ST/PC or FC/PC female connector. This wide range input accepts optical wavelengths of 1270nm to 1610nm, accommodating standard, CWDM or DWDM transmission schemes.

Do not hook up the 7707VT-2-HD DWDM cards and any 7707VR-2-HD series cards directly with a short fiber optic cable. The 7707VT-2-HD DWDM card produces +7dBm of power which will damage the receiver if connected directly.

Do not hook up the 7707VT-2-HD cards that output more than -7dBm of power (see 7707VT-2-HD specifications for output power of various laser types) and 7707VR-2-HD-H high sensitivity receiver cards directly with a short fiber optic cable. The 7707VT-2-HD cards that produce more than -7dBm of power will damage the receiver if connected directly.

HD OUTPUT: There are two BNC outputs for each of the two independent reclocked HD video signals, compatible with all SMPTE 292M standards.

2.1. CARE AND HANDLING OF OPTICAL FIBER

Never touch the end face of an optical fiber. Always keep dust caps on optical fiber connectors when not connected and always remember to properly clean the optical end face of a connector before making a connection.

The transmission characteristics of the fiber are dependent on the shape of the optical core and therefore care must be taken to prevent fiber damage due to heavy objects or abrupt fiber bending. Evertz recommends that you maintain a minimum bending radius of 5 cm to avoid fiber-bending loss that will decrease the maximum attainable distance of the fiber cable. The Evertz fiber optic modules come with cable lockout devices, to prevent the user from damaging the fiber by installing a module into a slot in the frame that does not have a suitable I/O module. For further information about care and handling of fiber optic cable see section 3 of the Fiber Optics System Design chapter in the front of the binder.

3. SPECIFICATIONS

3.1. OPTICAL INPUT

Number of Inputs: 1
Connector: Female SC/PC, ST/PC or FC/PC
Return Loss: >25dB
Input Wavelength: 1270nm to 1610nm
Maximum Input Power
Standard Version: -1dBm
-H Version: -7dBm
Optical Sensitivity
Standard Version: -21dBm
-H Version: -28dBm

3.2. SERIAL VIDEO OUTPUTS:

Standards: SMPTE 292M
Number of Outputs: 4, 2 per Independent HD 1.485Gb/s signals
Connectors: BNC per IEC 61169-8 Annex A
Signal Level: 800mV(nominal)
DC Offset: 0V ± 0.5V
Rise and Fall Time: 900ps(nominal)
Overshoot: < 10% of amplitude
Return Loss: > 15dB to 1.485Gb/s
Jitter: < 0.20UI

3.3. ELECTRICAL

Voltage: +12VDC
Power: 10 Watts
EMI/RFI: Complies with FCC regulations for class A devices
Complies with EU EMC directive

3.4. PHYSICAL

7700 or 7701 frame mounting:
Number of slots: 1

4. STATUS INDICATORS AND DISPLAYS

The 7707VR-2-HD has 5 LED Status indicators and a 4 digit alphanumeric display on the front card edge to show operational status of the card at a glance. The card edge pushbutton is used to select various displays on the alphanumeric display. Figure 4-1 shows the locations of the indicators and pushbutton.

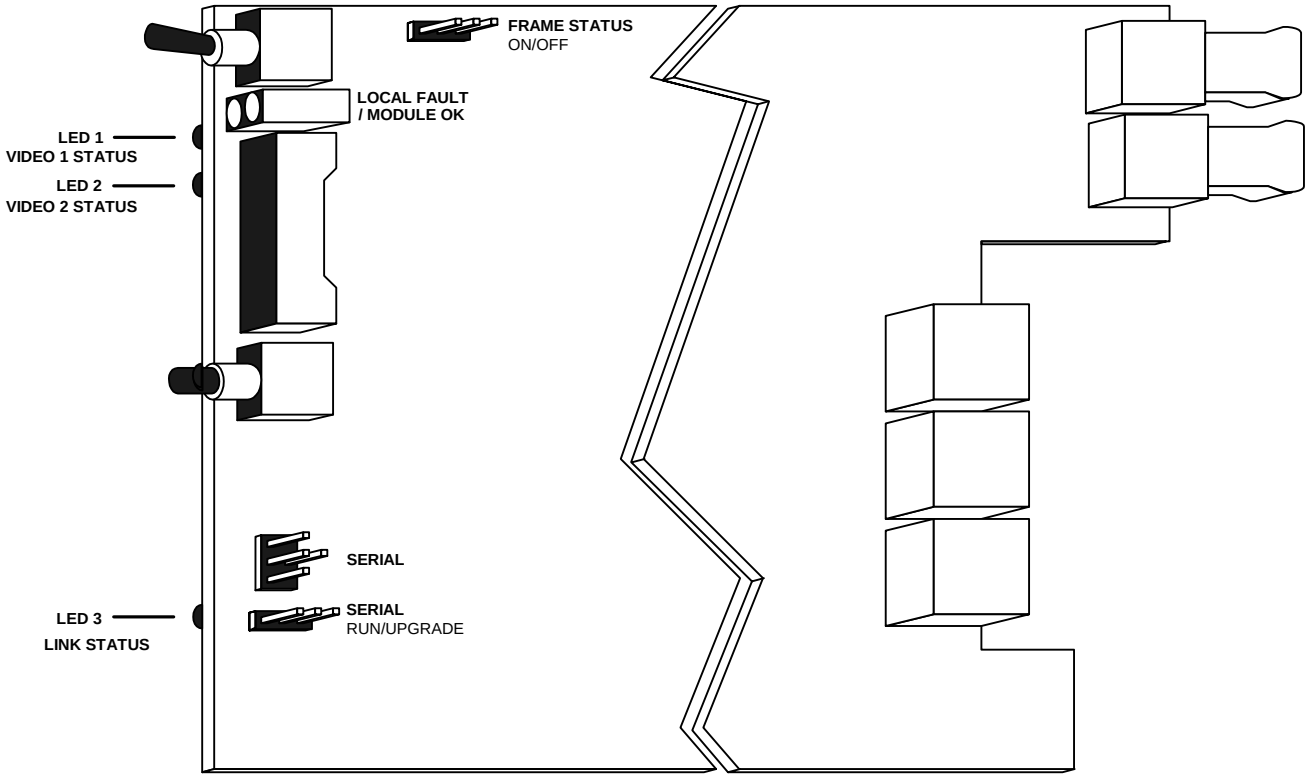

Figure 4-1: Location of Status Indicators and Jumpers

4.1. STATUS INDICATOR LEDS

LOCAL FAULT: This Red LED indicates poor module health and will be On during the absence of a valid input signal, low optical power or if a local input power fault exists (i.e.: a blown fuse). The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

MODULE OK: This Green LED indicates good module health. It will be On when a valid input signal is present, and the board power is good.

On the 7707VR-2-HD there are three small multi-color LEDs on the back of the board that indicate the status of video signals.

VIDEO 1 STATUS: Green indicates the presence of a valid signal on channel 1.
Yellow indicates the presence of CRC errors in the incoming channel 1 stream.
Red indicates a loss of video on channel 1.

VIDEO 2 STATUS: Green indicates the presence of a valid signal on channel 2.
Yellow indicates the presence of CRC errors in the incoming channel 2 stream.
Red indicates a loss of video on channel 2.

LINK STATUS: Green indicates the presence of a valid optical signal.
Yellow indicates the presence of bit errors in the optical signal.
Red indicates a loss or invalid optical signal.

4.2. DOT-MATRIX DISPLAY

Additional signal and status monitoring is provided via the 4-digit dot-matrix display located at the card-edge. The card-edge pushbutton and toggle-switch are used to navigate through the display menu. Figure 4-2 provides a quick reference to the display menu structure.

Toggle Switch ⇕	Pushbutton ⇨ Top Menu Level	Menu Level 1	Menu Level 2
	LINK ERR (If No Link with VT2HD) **OK** (If Linked with VT2HD)	**VSD1** (Video Standard)	**Output Video 1 Standard** (see list in 4.2.3 section)
		VSD2 (Video Standard)	**Output Video 2 Standard** (see list in 4.2.3 section)
		PWR (OpticalPower)	**0 to -40 dBm** (1dBm steps)
		STD1 (Output Video Std. on Loss of Input Signal)	**AUTO / Select Std. 1** (Default - 1080i/59.94)
		STD2 (Output Video Std. on Loss of Input Signal)	**AUTO / Select Std. 2** (Default - 1080i/59.94)
		FRST (Factory Reset)	**YES or NO**
		DISP (Display Orientation)	**VERT or HOR**
		VER (Software Version)	Version number and build shifted right to left

Figure 4-2: Card Edge Menu Structure

4.2.1. Top Level Menu

The 7707VR-2-HD card edge display can show whether there is valid optical connection with the companion 7707VT-2-HD. If no such connection exists, the card edge display will flash **LINK ERR**. Conversely, if a valid optical connection exists between the 7707VT-2-HD and 7707VR-2-HD the card edge display will read **OK**.

4.2.2. Menu Level One

The following display messages indicate what is being displayed.

VSD1:	Video Standard in Use on Channel 1.
VSD2:	Video Standard in Use on Channel 2.
PWR:	Input Optical Power.
STD1:	Sets Output Video Standard on Loss of Input Signal on Channel 1.
STD2:	Sets Output Video Standard on Loss of Input Signal on Channel 2.
DISP:	Sets the orientation of the text displayed on the card edge.
FRST:	Factory Reset (Default).
VER:	Displays the present Firmware version.

4.2.3. Displaying the Video Standard

The 7707VR-2-HD detects all SMPTE 292M Video standards present at its optical input. For the sake of brevity, only *VSD1* will be discussed in the manual.

VSD1
NONE
UNKNOWN
1035I/60
1035I/59.94
1080I/50-1
1080I/50-2
1080I/60
1080I/59.94
1080P/30
1080P/29.97
1080P/25
1080P/24
1080P/23.98
1080P/24-SF
1080P/23.98-S
1080P/25-SFEM
720P/30
720P/29.97
720P/50
720P/25
720P/24
720P/23.98
1080P/24-EM
1080P/23.98-EM
1080P/24-SF-EM
1080P/23.98-SF-EM
1080P/24-EM
1080P/23.98-EM
1080P/24-SF-EM
1080P/23.98-SF-EM
720P/30-EM
720P/29.97-EM
720P/50-EM
720P/25-EM
720P/24-EM
720P/23.98-EM
720P/60-EM
720P/59.94-EM

To display the Video Standard, press the pushbutton one or more times until the VSD1 or VSD2 message is shown on the display. After one second the detected video standard will be shown.

4.2.4. Displaying the Optical Power

The 7707VR-2-HD module can measure and display the input optical power over a range of 0dBm to –40dBm at increments of 1dBm for the standard version and -7dBm to –40dBm in 1dBm increments for the –H version. To display the Input Optical Power toggle the switch one or more times until the **PWR** message is shown on the display. Press the pushbutton to display the optical power.

PWR
OVER
0 to -40
-7 to -40
LOW

OVER	Indicates optical input power exceeding –1dBm for standard version and -7dBm for "–H" version
0 to –40	Optical input power within this range (Standard Version).
-7 to –40	Optical input power within this range (-H Version).
LOW	For power lower than –40dBm

4.2.5. Setting the Output Video Standard On Loss of Input Signal

The 7707VR-2-HD can be configured to output black video with a user defined SMPTE 292M standard if an input video signal is lost. For the sake of brevity, only *STD1* menu will be discussed in the manual.

STD1
AUTO
STD1

To select the video standard toggle the switch one or more times until **STD1** (for outputs 1 & 2) or **STD2** (for outputs 3 & 4) message is shown on the display. Select the **STD1** menu by pressing the push button. Once in the **STD1** submenu the output standard of each channel on loss of video can be selected by toggling through the menu and selecting either **AUTO** or **STD1**. By selecting **AUTO**, the 7707VR-2-HD will output black video formatted with the same SMPTE 292M standard that was being output before. Selecting **STD1** will allow the user to choose one of the standards listed above in section 4.2.2.

4.2.6. Performing a Factory Reset

The 7707VR-2-HD allows performing a factory reset of card parameters.

FRST
YES
NO

Enter FRST menu item, toggle to YES and hit the push button. This restores the default parameters of the card. The default optical threshold is –40dBm.

4.2.7. Setting the Orientation of the Text on the Card Edge Display

On the 7707VR-2- the **DISP** display allows you to set a horizontal or vertical orientation for the card edge display messages. Toggle the switch until **DISP** appears on the card edge, enter the **DISP** submenu by pressing the push button. Use the toggle switch to change between **HOR** and **VERT**. Press the push button to make your selection.

DISP
VERT
HOR

HOR Horizontal display used when the module is housed in the 1 rack unit 7701FR frame or the stand-alone enclosure.

VERT Vertical display used when the module is housed in the 3-rack unit 7700FR frame.

4.2.8. Displaying the Firmware Version

The **VER** display shows the firmware version and build number of the 7707VR-2-HD firmware. The message will scroll across the display.

For example: **VER 1.0 BLD 067**

5. JUMPERS AND LOCAL CONTROLS

Several jumpers, located at the front of the module are used to preset various operating modes. Figure 4-1 shows the locations of the jumpers.

5.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

The FRAME STATUS jumper determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR frame's global status bus.

FRAME STATUS: To monitor faults on this module with the frame status indicators (on the Power Supply FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper in the On position (default)

When this jumper is installed in the Off position local faults on this module will not be monitored.

5.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE: The UPGRADE jumper is used when firmware upgrades are being done to the module. For normal operation it should be installed in the *RUN* position. See the *Upgrading Firmware* section of this manual for more information.

To upgrade the firmware in the module unit pull it out of the frame. Move the UPGRADE jumper into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto SERIAL header at the card edge. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* section of this manual. Once the upgrade is completed, remove the module from the frame, move the UPGRADE jumper into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

6. VISTALINK® REMOTE MONITORING/CONTROL

6.1. WHAT IS VISTALINK®?

VistaLINK® is Evertz's remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. VistaLINK® provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Card configuration through VistaLINK® PRO can be performed on an individual or multi-card basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, VistaLINK® enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. An SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz VL-Fiber demo Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz VistaLINK® enabled fiber optic products.

2. Managed devices (such as 7707VT-2-HD and 7707VR-2-HD cards) each with a unique address (OID) communicate with the NMS through an SNMP Agent. Evertz VistaLINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC VistaLINK® frame controller module, which serves as the Agent.

3. A virtual database, known as the Management information Base (MIB), lists all the variables being monitored, which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

For more information on connecting and configuring the VistaLINK® network, see the 7700FC Frame Controller chapter.

6.2. VISTALINK® MONITORED PARAMETERS

The following parameters can be remotely monitored through the VistaLINK® interface.

Parameter	Description
Optical Power	A range of values describing optical power at the fiber input.
Video 1, 2 Output Standard	A range of values describing the output video standard.
Video 1, 2 Not Present	Indicates no valid video input signal is present. (the state of the VIDEO PRESENT LED)
Video 1, 2 Error	Indicates a video error.
Optical Power Below Threshold	Indicates that optical power is below set threshold.
Link Loss	Indicates optical link loss.
Link Error	Indicates an error on optical link.

Table 6–1: VistaLINK® Monitored Parameters

6.3. VISTALINK® CONTROLLED PARAMETERS

The following parameters can be remotely controlled through the VistaLINK® interface.

Parameter	Description
Video 1, 2 Output Standard Upon Loss of Input	Allows user to set output video standard upon loss of input.
Optical Power Alarm Threshold	Allows user to set optical power of the alarm threshold of weak power signal.

Table 6–2: VistaLINK® Controlled Parameters

6.4. VISTALINK® TRAPS

The following traps can be remotely reported through the VistaLINK® interface.

Trap	Description
Optical Power Below Threshold	Indicates optical power below threshold.
Video 1, 2 Not Present	Indicates no valid video input signal is present (the state of the Video Present LED).
Video 1, 2 Error	Indicates a video error.
Link Loss	Indicates an optical link loss.
Link Error	Indicates an error in an optical link.

Table 6–3: VistaLINK® Traps